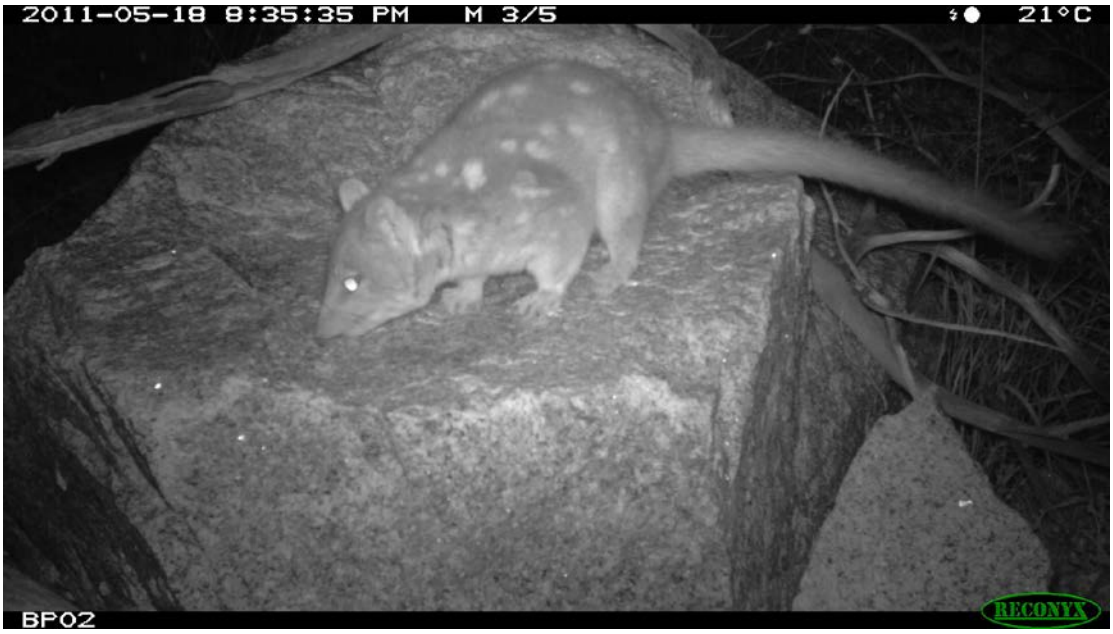
Government of **Western Australia**
Department of **Environment and Conservation**

Northern Quoll Survey and Monitoring Project

Pilbara Region of Western Australia



Annette Cook and Keith Morris

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Science Division, Department of Environment and Conservation
Western Australian Wildlife Research Centre
POBox 51, Wannerooo, WA 6946

Regional survey and monitoring of Pilbara northern quoll populations

The northern quoll, *Dasyurus hallucatus*, is the smallest of all Australian quolls (300 – 1200g) and is restricted to five regional populations across Queensland, the Northern Territory and Western Australia, both on the mainland and offshore islands. The species distribution has declined gradually over the last 50 years with a number of threats either directly or in combination with each other, thought be contributing to the species decline. Threats include mortality caused by poisoning from cane toads, inappropriate fire regimes (and predation by introduced animals after fire) and the removal, degradation and fragmentation of habitat as a result of development actions, mining activities and pastoralism. The northern quoll is listed as a threatened ('Endangered') species under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999.*

The Pilbara northern quoll survey and monitoring project commenced in 2012 and is being conducted over 10+ years with the aim of improving our understanding of northern quoll population distribution, ecology, abundance and demographics in the region. The project aims to provide information to environmental regulators, consultants and resource development companies that will allow appropriate management to ensure the persistence of resident northern quoll populations in the Pilbara region.

Objectives

- To improve understanding of northern quoll distribution, ecology, and abundance and other demographic parameters in the Pilbara and allow comparison with published studies in the Kimberley, Northern Territory and Queensland.
- To inform management for the conservation of northern quoll populations in and around mining sites and other developments in the Pilbara.
- To clarify the taxonomic and conservation status of the Pilbara northern quoll population
- To provide a model for other proposed regional fauna projects in the Pilbara

Methodology

Survey and long-term monitoring site selection:

A desktop review of northern quoll distribution was undertaken in 2010 and areas identified as suitable quoll habitat were targeted for further survey, after consultation with landholders and regional DEC staff.

In 2012, a survey of up to 100 potential sites to detect quolls was commenced. At each site, up to 20 remote motion sensor cameras are being deployed for 2 nights to record presence/absence data, and habitat characteristics of each site is recorded (Appendix A). From this survey, and subsequent trapping to obtain estimates of quoll abundance, long-term northern quoll monitoring sites are being selected. The land tenure and security of the site is also being taken into consideration as these sites will need to remain free of mining and / or pastoral disturbance as much as possible. Up to 10 long-term quoll monitoring sites will be established across the Pilbara. Those selected to date include Dolphin Island nature reserve (the only Pilbara island quoll population), Millstream

Chichester National Park, Indee pastoral lease and Karratha environs, with Yarrie pastoral lease, De Grey pastoral lease and Mt Florance pastoral leases to be confirmed.

Monitoring parameters:

The following parameters will be monitored at each site:

- Body weight
- Morphometrics – short pes, head length, tail diameter at base
- Sex ratio
- Age class
- Reproductive status / condition
- Health / body condition
- Diet
- Abundance
- Genetic diversity
- Fox/cat/dog/dingo presence/abundance

At each monitoring site there will also be opportunities for ecological research projects such as examining den and feeding habitat use / partitioning, movements across the landscape, and impact of introduced predators.

Monitoring protocols:

Because of anticipated low capture rates and seasonal fluctuations in quoll population abundance it will be necessary to monitor sites over a long period (10+ years) to detect any significant changes or trends in abundance and other demographic parameters.

Monitoring at each site will be conducted two times per year:

- In April-early May after dispersal on juveniles and prior to the onset of the breeding season.
- In September-early October after breeding activity has ceased, and prior to females depositing young in dens, to obtain data on breeding success and male survival.

As northern quolls generally live in linear, rocky habitats, population monitoring will be undertaken using trapping transects rather than grids. Transects will be configured to achieve optimal cover of the sites. For example, either one long transect along the foot of a mesa or two or more parallel lines across a broader habitat types such as low hills or granite outcrops. The aim is to deploy 50 traps per site However, the number of traps may also be determined by extent of habitat at each individual site. For example, if the habitat area is limited and transects extend into unsuitable habitat the number of traps at that site may need to be reduced as the inter-trap spacing must remain consistent across all sites. The configuration applied initially at an individual site must be maintained at that site.

Specific quoll trapping methods:

- Small Sheffield wire cage traps (45 cm x 17 cm x 17 cm)
- 50 traps spaced 50 m apart

- 100m between trap lines if more than one transect
- Individual trap locations are fixed and marked (GPS and dropper post) for the duration of the monitoring program.
- Traps opened for 4 consecutive nights at each site (200 trap nights)
- Traps checked and closed within 3 hours of sunrise, rebaited and opened in the late afternoon
- Universal bait (peanut butter, oats, sardine or preferably bacon)

Data collection:

- All captured quolls are implanted with a subcutaneous microchip (PIT) for individual identification.
- Standard measurements of all captured quolls are taken (body weight, short pes length, head length, age class, sex and breeding condition)
- A small amount of ear tissue is collected from all individuals at initial capture for genetic analysis.
- A sample of scats is collected each trapping session for dietary analysis.
- An estimation of fox/cat/dog/dingo activity at each site will be derived using either sand plots or remote cameras.

Morphometric, dietary, breeding and genetic information will be compared with other populations of northern quolls.

Habitat monitoring and modelling:

Habitat attributes are being recorded at all sites (including camera survey and monitoring sites) and will be analysed to help predict the spatial distribution of suitable habitat and the probability of quolls occupying locations based on environmental attributes. Fire history and other disturbances such as cattle impact will also be assessed and monitored.

- Data sheets are used to record habitat attributes (Appendix A)
- Photo points will be established at all long-term monitoring sites
- Digital rainfall gauges will be installed at all long-term monitoring sites

When GPS transmitters small enough for use on for northern quolls (<25 g weight) can be sourced field trials to assess performance, wearability and durability will be undertaken. This will allow more accurate information on habitat use, home range, movements and denning sites to be obtained than is currently available with VHF technology.

Reporting

Much of the monitoring data collected will be suitable for comparison with published and unpublished studies for quolls in the Kimberley, Northern Territory and Queensland. An annual report on population and habitat monitoring will be prepared, and peer reviewed papers prepared for every five years of monitoring.

APPENDIX A

Habitat assessment for northern quoll survey and monitoring sites

PILBARA NORTHERN QUOLL DATA SHEET - Habitat Survey

Site name:		Site number:	
Date:	Time:	Recorder/s:	
GPS waypoints:		GPS datum:	Patch size:
Coordinates:			

Site description (vegetation & landform pattern):

LANDFORM ELEMENT (20-40m radius)

Topographic context

C	Crest	U	Upper Slope	L	Lower Slope	F	Flat
R	Ridge	M	Middle Slope	T	Toe	D	Depression

LAND SURFACE

Site disturbance **% of site disturbed / fragmented**

0	No effective disturbance	
1	Limited clearing / fragmentation	%
2	Extensive clearing / fragmentation	
3	Highly disturbed e.g. mining, quarry	

Grazing

0	None
1	Light
2	Moderate
3	Severe

Weeds

0	None
1	Few
2	Moderate
3	Many

Notes:

Rock outcrop

TYPE

Abundance

0	No exposed bedrock	3	Rocky (10-20%)
1	Very slightly exposed (<2%)	4	Very rocky (20-50%)
2	Slightly exposed (2-10%)	5	Rockland (>50%)

Notes:

Water body present within site

S	Soak/Spring	
PC	Permanent creek	Notes:
SC	Seasonal creek	
PP	Permanent pool	
SP	Seasonal pool	
B	Bore/Windmill	
D	Dam	
R	River	

Ground cover

Bare soil:	%
Rock:	%
Gravel:	%
Veg (ground stratum):	%
Leaf litter:	%
Litter depth:	cm

Presence of Reptiles

Signs:

Comments on weather:

Coarse fragments on the surface

TYPE:

Abundance		Size of fragments	
0	No coarse fragments	1	Small pebbles (2-6mm)
1	Very few (>2%)	2	Medium pebbles (6-20mm)
2	Few (2-10%)	3	Large pebbles (20-60mm)
3	Common (10-20%)	4	Cobbles (60-200mm)
4	Many (20-50%)	5	Stones (200-600mm)
5	Abundant (50-90%)	6	Boulders (600mm-2m)
6	Very abundant (>90%)	7	Large boulders (>2m)

Soil

Comments on texture:

VEGETATION

Cover Class:	<2%	2 - 10%	10 - 30%	30 - 70%	70 - 100%

TREES			
	over 30m	10 - 30m	under 10m
Life Form			
Cover class %			
Dominant species			

MALLEES	
over 8m	under 8m
	

SHRUBS		
	over 2m	1 - 2m	under 1m
Life Form			
Cover class %			
Dominant species			

HERBS	SEDGES
	

GRASSES		
	Hummock	Tussock	Bunch
Life Form			
Cover class %			
Dominant species			

Vegetative growth stage	
1	Early regeneration
2	Advanced regeneration
3	Senescent phase

EVIDENCE OF FIRE			
Frequency	**Intensity**	**Patchiness, % of ha burnt**	**Distance to large unburnt habitat**
0 Long unburnt	0 No damage		1 < 100m
Burnt	1 Minor, scars	_____ %	2 100 - 500m
1 Pre-rainfall event	2 Some defoliated		3 500m - 1km
2 Post-rainfall event	3 Most defoliated		4 > 1km

Photos:

Comments: